Digital-to-analog converter comprising means for improving the conversion linearity

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FIELD OF THE INVENTION

The invention relates to a digital-to-analog converter for converting a digital value into an analog quantity, said converter comprising current sources switched according to said digital value in order to generate an output current reflecting the value of said analog quantity.

The invention has in particular many applications in digital-to-analog converters having an architecture of the thermometric or segmented type.

BACKGROUND OF THE INVENTION

Some digital-to-analog converter architectures are based on the switching of a certain number of current sources in an output load. For example, the number of current sources switched simultaneously in a converter having an architecture of the thermometric or segmented type is equal to the digital input value to be converted.

Fig.1 depicts a switch of a known type used in a digital-to-analog converter for making a current source I flow into an output load R. This switch consists of a differential structure comprising bipolar transistors TA and TB controlled by a control signal Uc derived from the digital value to be converted. The function of this switch is therefore equivalent to a switch SW controlled by the control signal Uc.

When the switching transistors TA-TB are switched, the Early effect which is manifested at the transistors must be taken into account for best modeling the dynamic characteristics of the switch. At low frequency, the Early effect is manifested in the form of a resistance Rp known as the Early resistance, with a high constant value between the collector and emitter of the transistors. At a higher frequency, stray capacitive effects of the switch (junction capacitances in the transistors TA-TB, interconnection capacitances between the elements constituting the switch equivalent to a capacitance Cp put in parallel to the current source I) manifest through an impedance with a value decreasing with the frequency. The Early effect combined with the stray capacitive effects are therefore equivalent to a stray